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(56) Documents Cited

GB 2196525 A GB 1144674 A US 5031428 A  
US 4894869 A US 4821324 A US 3955575 A

(58) Field of Search

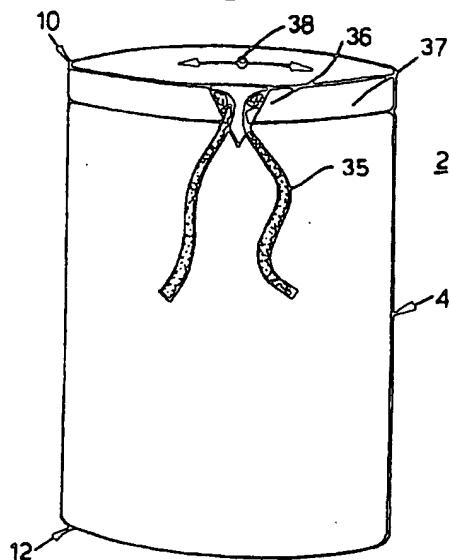
UK CL (Edition O ) A3V V1B3A1 V1B3A2 V1B3B  
V1B3X , A5R RBBX RPF  
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13/62 13/66 13/72 13/74  
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(54) Abstract Title

Incontinence bed wear

(57) A garment 2 in the form of a tube 4 comprising a waist end 10 and a hem end 12 and having one or more liquid absorbent inner surfaces and a liquid impervious outer surface. The liquid absorbing material is dimensioned to give an absorbency to match the urine output of the user. One of the liquid absorbing surfaces may take the form of a loin cloth attached to the kilt-like garment or worn separately underneath the garment 2. A garment is also disclosed in the form of outer culottes of liquid impervious material worn over separate inner culottes of absorbent material.

Fig.1.



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Fig.1.

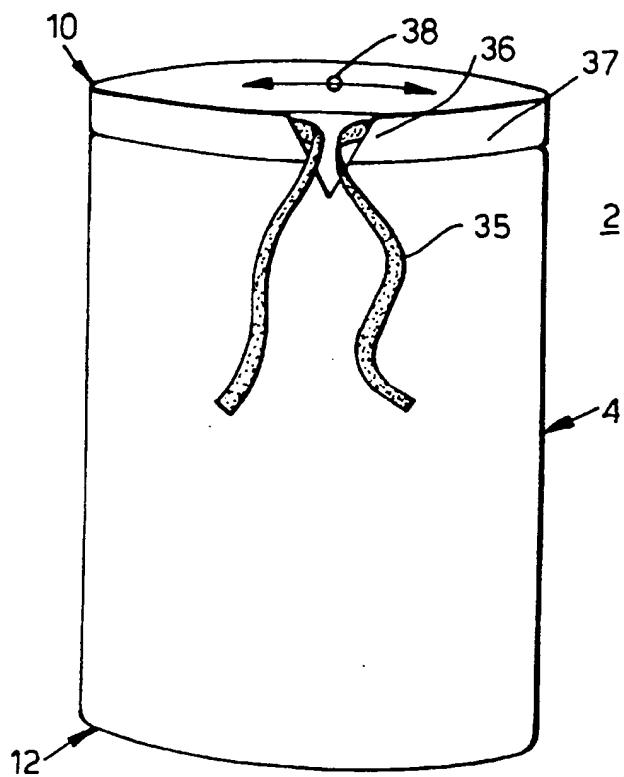


Fig.2.

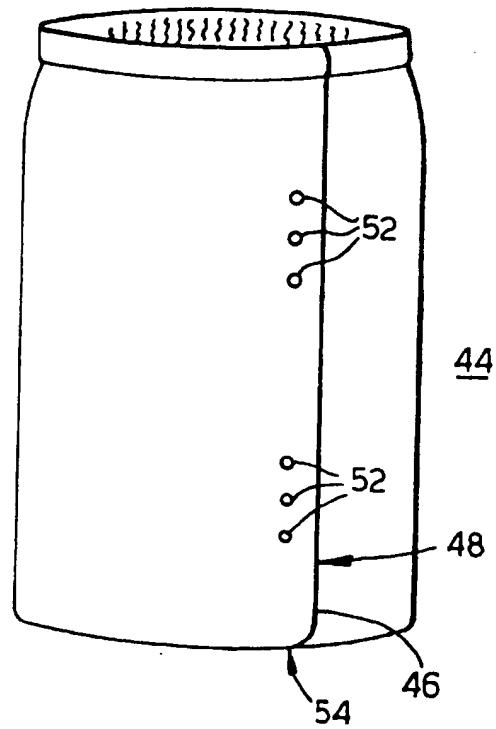


Fig. 3.

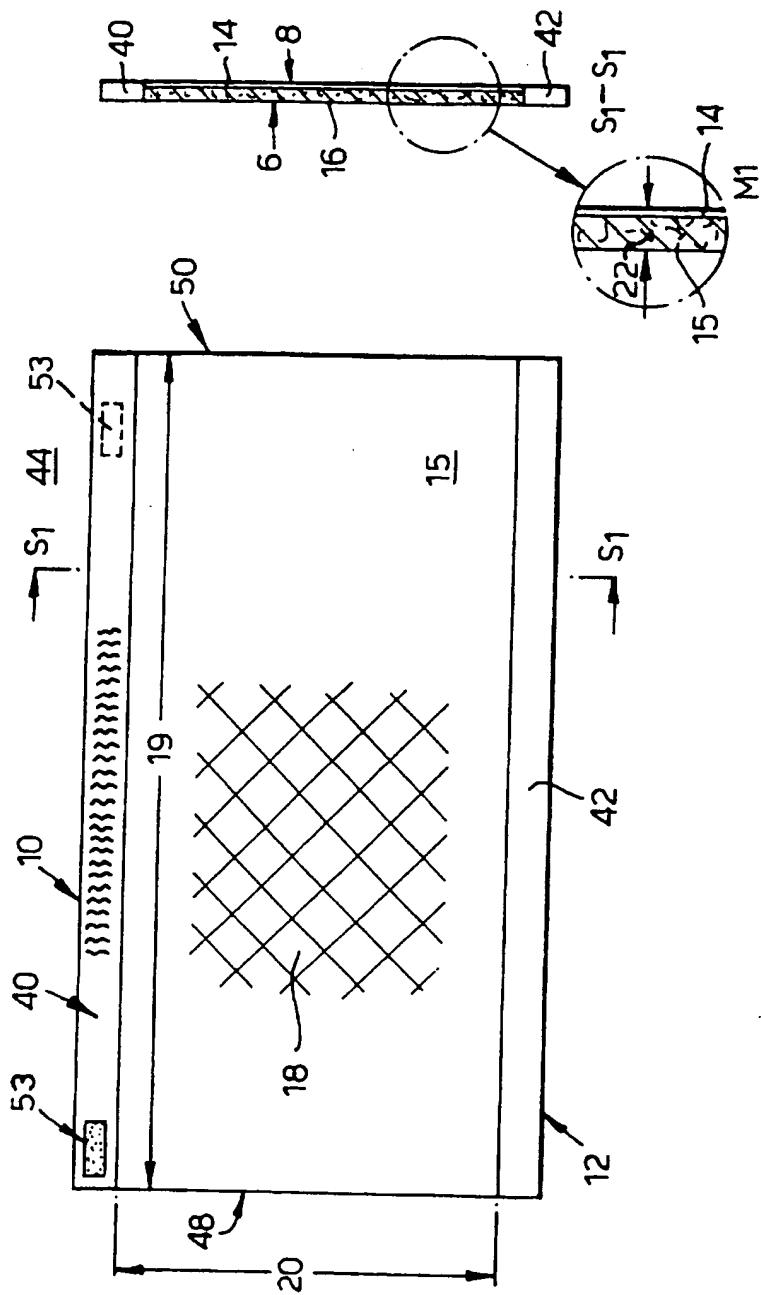


Fig.4.

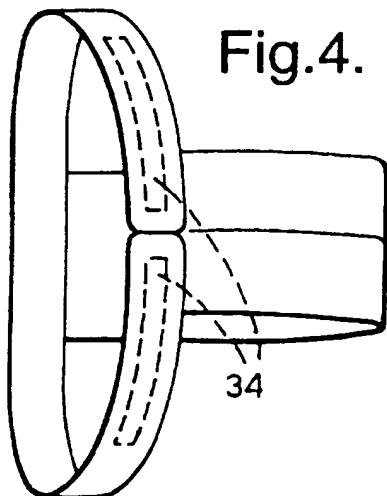


Fig.5.

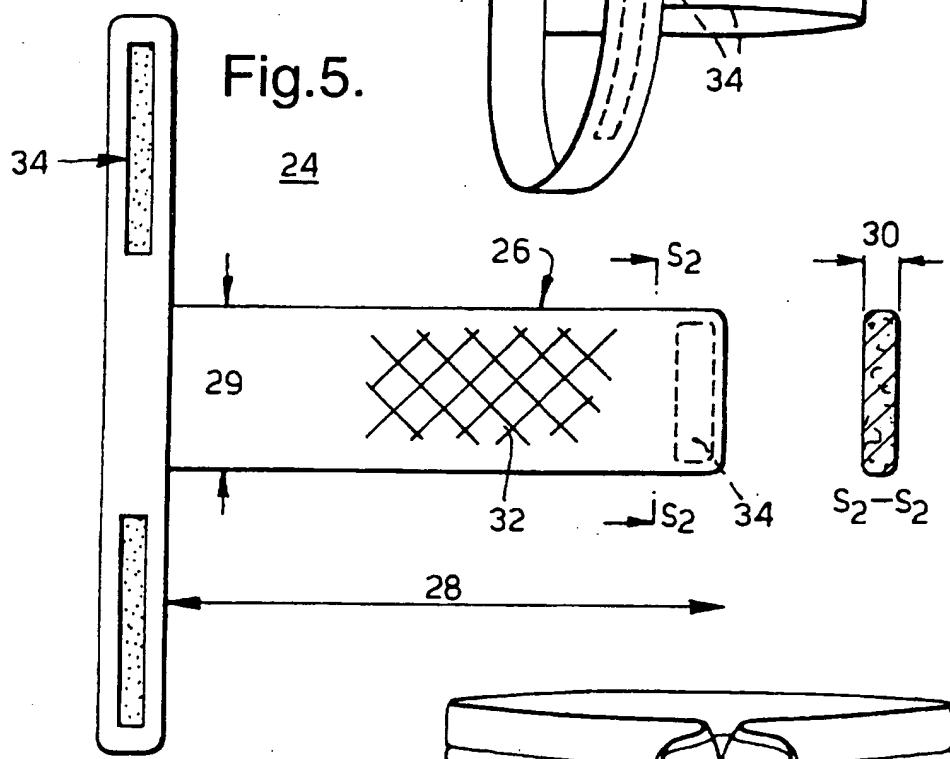


Fig.8.

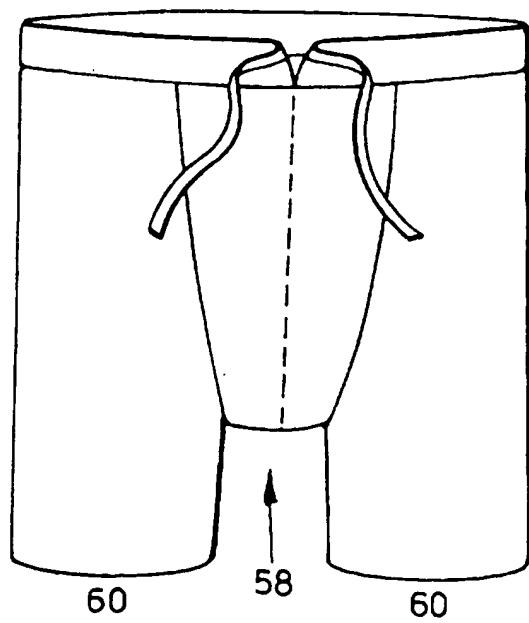


Fig.6.

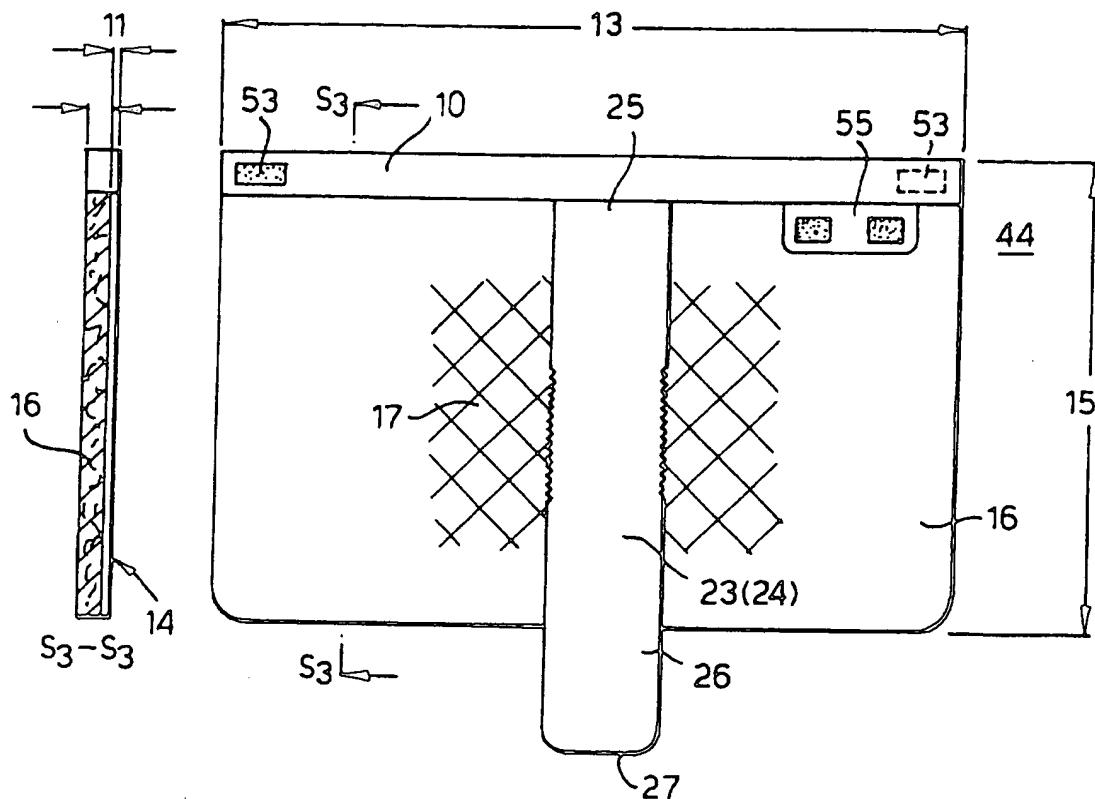


Fig.7.

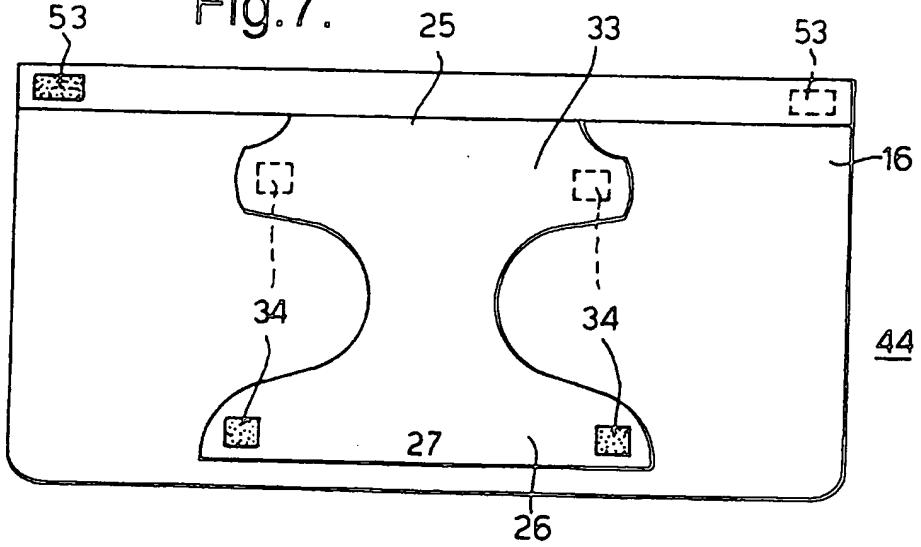


Fig.9.

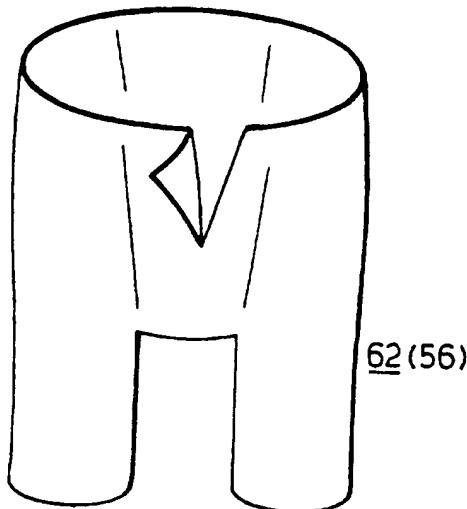


Fig.10.

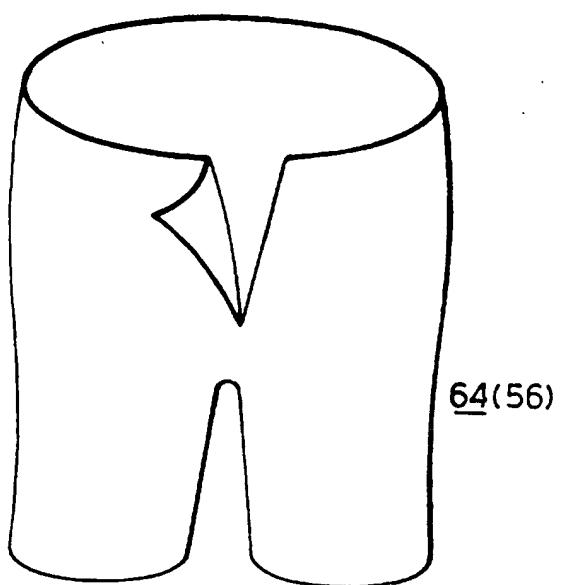
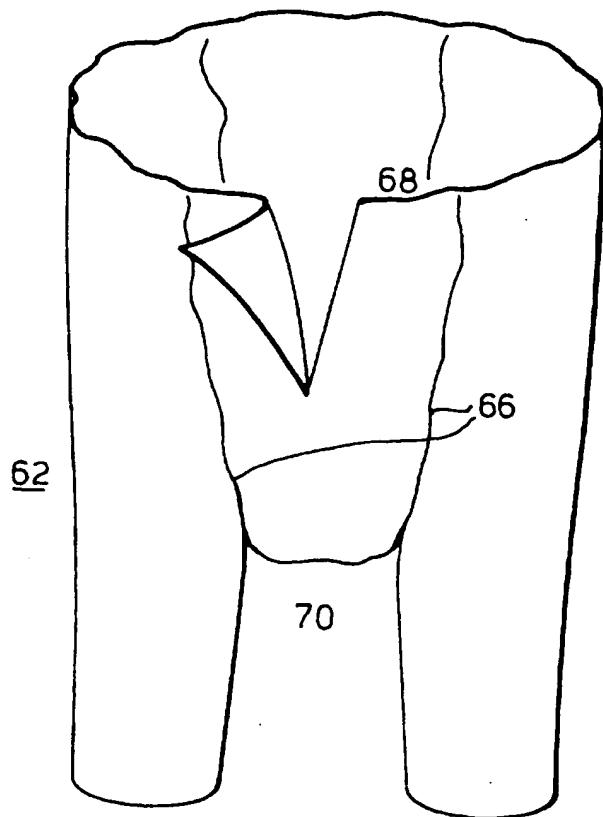


Fig.11. 72



INCONTINENCE BED-WEAR

This invention relates to incontinence garments worn mainly in bed. Three million people in the UK suffer from urinary incontinence. The majority live independently in the community and leak only small amounts of urine. A previous invention described in GB2183448 B alleviates the problems experienced by sufferers who involuntarily void only small quantities of urine. However, substantial numbers of sufferers have heavy incontinence. Most of these people live in residential nursing homes or continuing care hospitals. They require absorbent products to manage their problem. Known absorbent products suitable for heavy incontinence can be either disposable (the majority) or reusable.

As a broad principle it has been established that reusable products can be cheaper to use than a disposable product on a per-use basis over many months, but laundry costs are a major factor, and reducing them would increase the economic attraction. Hence there is an unsatisfied demand for reusable absorbent products. That is for a product effective against urinary incontinence that is washable, and that yields cost savings when compared with existing disposable products.

Known reusable absorbent pads include bed-pads and body-worn pads. These are designed to be laundered and reused many times before discarding. As their name suggests, reusable bed-pads are used in bed. They are used mostly at night.

Reusable bed-pads vary in details of design. They are usually about 90 x 75cms. They usually contain three layers of material: an absorbent core sandwiched between a waterproof backing on one side, and a facing layer (next to the skin) on the other. The absorbent core is

usually made from a felt of polyester and or rayon fibres. Urine is mostly held between the fibres and so the absorption capacity depends more on the volume of the absorbent core than on differences in the properties of the various fibres.

5       Reusable body-worn pads may be used during the day as well as at night. Known body-worn pads are available as: insert pads held in place by close fitting underwear, for light to moderate incontinence; pad-pants that comprise a pair of pants, resembling ordinary underwear, with an absorbent panel sewn into the crotch, for light to moderate  
10 incontinence; and, diaper-style products, similar to disposable baby diapers but reusable, for heavily incontinent users.

All three categories of body-worn pads are made from materials similar to those used in reusable bed-pads.

Facing materials fall into two categories. Some are made of  
15 cotton that because it is hydrophilic is comfortable when it is dry, but rather uncomfortable when it is wet. Others are made from polyester that is hydrophobic and, therefore, presents a dryer surface to the user when the core contains urine but is, perhaps, less comfortable than cotton when it is dry. Absorbent cores and facing layers are always  
20 sewn together at the periphery. Usually they are quilted across the entire surface to impede the formation of uncomfortable creases. This also promotes rapid wicking of urine through to the absorbent.

Water-proof backings are usually made from a vinyl or polyurethane film that is either sewn to the facing and absorbent core at  
25 the periphery (single-piece system) or comes as a separate sheet (two piece system). The advantage of two piece systems is that the waterproof layer, which is the most fragile component in any reusable

bed-pad, can be replaced as a separate item if it gets damaged in use or laundering. The disadvantages are that two piece systems are generally more fiddly to put on the bed and that the two pieces might slip from position relative to one another.

5       Reusable bed-pads have the following failings. They are leaky. Leakage occurs: by wicking onto other bed clothes (for example sheets or night-clothes pulled down onto the pad); by seepage from the top edge of the bed-pad, due to weight of the torso; by men passing urine vertically onto an unprotected top sheet. Heavily incontinent people  
10 rarely leak more than 300 to 400 ml of urine during a night but to overcome their inherently leaky design, bed pads are usually made with a theoretical capacity of around 2 litres in an attempt to overcome their short-comings. This results in long expensive drying times.

To overcome leakage due to transport of urine into bed linen via  
15 night-clothes. Users have to sleep with their night clothes pulled up high above the waist. This requirement is unpopular because it injures dignity. Also users and carers object to users laying in bed unclothed below the waist.

With either sex, bed-pads sometimes are misplaced from  
20 position, leading to leakage. As a result some bed-pads designed for use on single beds have flaps along two edges that are tucked beneath the bed mattress. This helps to keep the bed-pad in place.

Insert pads and pad-pants are well accepted by users. However, reusable diaper-style products, the only body-worn pads designed for  
25 heavy incontinence, are unpopular with users because they have the following failings. They are also leaky. The main leakage route is between leg and garment at the crotch. They also take a long time to

dry, for the same reasons as for reusable bed-pads. In addition, they are deviant in appearance because they resemble baby clothes.

In summary whilst reusable products for light incontinence are a widely accepted alternative to disposable products, this is not true of 5 reusable products for heavy incontinence. Existing reusable bed-pads and body-worn pads seek to overcome their poor leakage performance by using larger quantities of absorbent material. The result is longer and more costly drying times.

Accordingly the current invention provides a garment for an in-10 continent user in the form of a tube with an inner surface and an outer surface, a waist end and a hem end, having at the outer surface a layer of liquid impervious material, and at the inner surface a liquid absorbing material characterised in that: the liquid absorbing material is arranged and dimensioned to give a liquid absorbency to match a urine 15 output of the user.

This has the advantage that garments according to the invention make more effective and efficient use of smaller quantities of absorbent material. This advantage has been achieved by systematically addressing the various leakage routes in existing commercial products 20 that have been discussed in the summary of the prior art. For example a large area of absorbent material is provided. This may minimise leakage of urine from the hem end of the garment. Also the garment when worn in bed may prevent leakage of urine to the bed because the outer layer of liquid impervious material forms a continuous tube 25 around the user. Also because the absorbency of the garment is matched to the urine output of the user all the urine is contained within absorbent material. This leads to another advantage in that a lesser

volume of liquid absorbing material is used than may be present in currently available reusable bed pads or body worn pads. Consequently less laundry water may be absorbed by the garment. Hence the drying time required to remove the laundry water may be reduced. In this way 5 laundering costs may be reduced.

There is further provided, according the invention, that the liquid absorbing material may comprise a first and a second layer of liquid absorbing material, the second layer of liquid absorbing material being contactable with the first layer of liquid absorbing material. This 10 aspect of the invention gives the advantage that the addition of the addition of the second layer of liquid absorbing material may allow adjustment of the absorbency of the garment. The Applicant has collected and weighed used bed-pads of heavily incontinent people. He has found that 80% of bed-pads have of less than 200g of urine in them; 15 90% have less than 300g and 97% have less than 500g and so on. From a design point of view there is a law of diminishing returns. However, this data will allow a person skilled in the art to make an informed decision on where to strike the balance between the amount of leakage that he is be prepared to tolerate (which argues for high absorbency) 20 and the amount he is prepared to pay for drying (which argues for low absorbency). Analysis of urine weights from different users will discover which users leak more than others. The option of a senod layer of liquid absorbing material may allow the amount of absorbent material to be adjusted for different users. Also the loin cloth may 25 advantageously be made in two or three levels of absorbency to further vary the absorbency of a garment according to the invention.

There is further provided, according the invention that the garment may be arranged in the form of a kilt, having a longitudinal split with a first edge and a second edge, the longitudinal split may be sealable by overlapping the first edge over the second edge and a 5 fastening means may be arranged to hold the kilt in an overlapped position. The advantage of this aspect of the invention is that although it may be put on with the user standing; it may also be put on with the user in bed. Many users are frail and the kilt may be easily put on by rolling a frail user onto the kilt (having first laid it on a bed) and then 10 securing the fastening mean that may be draw cords, or Velcro fasteners, or press studs. The kilt may be suitable for women or for men. Another advantage is that the garment may be opened out for laundering. This is advantageous in two ways. Firstly, during spin 15 drying the kilt may be arranged with the first absorbing layer outwards to promote the release of the laundering water. Secondly, during tumble drying the open kilt presents a large surface area that also promotes the release of the remainder of the laundry water.

There is further provided, according the invention, that the second layer of liquid absorbing material may be arranged in the form 20 of a loin cloth wearable by the user. The advantage of this aspect of the invention is that leakage may be minimised because the loin cloth is close fitting. Also the loin cloth can be laundered separately and it can be replaced independently if it wears out first.

There is further provided, according the invention, that the loin 25 cloth may be attached at the waist end of the garment. This gives the advantage that in addition to increasing the absorbency of the garment the loin cloth remains in contact with the first layer of liquid absorbing

material so ensuring transport of urine into the first layer of liquid absorbing material.

There is further provided, according the invention, that the loin cloth may have closeable side openings. The advantage of this aspect 5 of the invention is that the closeable side openings may allow the loin cloth to have a larger area of the second absorbing layer and so may have a higher liquid absorbency.

There is further provided, according the invention, that the loin cloth may be in the form of a diaper. This has the advantage of 10 providing a larger amount of absorbent material in the crotch area and at the same time as allowing the first layer of absorbent material to be fairly thin.

There is further provided, according the invention that the garment may be in the form of culottes having a bifurcation configured to 15 provide, at the hem end, two leg openings. The advantage of this aspect of the invention is that the culottes may have a greater aesthetic acceptability among men. In addition the culottes may provide additional liquid absorbing material in a crotch area of the culottes.

There is further provided, according the invention that the 20 culottes may have the liquid absorbing material may be formed into a separable inner culottes, and the layer of liquid impervious material formed into a separable outer culottes. The advantage of this aspect of the invention is that the inner and outer culottes may be separated for laundry. This has the advantage that the inner culottes may have shorter 25 spin drying and tumbler drying times because of the absence of the liquid impervious outer culottes.

There is further provided, according the invention that the separable inner culottes has one or more elasticated seams that pass from a front part of the waist end, underneath a crotch area of the separable inner culottes, to a back portion of the waist end. The advantage of this 5 aspect of the invention is that more liquid absorbing material may be gathered into the crotch area of the inner culottes.

There is further provided, according the invention, at the waist end of the garment an adjusting means providing a liquid tight seal between the user and the garment. Advantages are that a range of waist 10 sizes can be accommodated by the garment whilst at the same time inhibiting leakage of urine from the waist end of the garment.

There is further provided, according the invention a first band of hydrophobic material is provided at the waist end. This gives the advantage of further inhibiting leakage of urine from the waist end of 15 the garment.

There is further provided, according the invention, a second band of hydrophobic material is provided at the hem end. This gives the advantage of inhibiting leakage of urine from the hem end of the garment.

20 There is further provided, according the invention, a stitching to attach: the layer of liquid impervious material to the of liquid absorbing material; or, the layer of liquid impervious material to the first or the second band of hydrophobic material; or, the liquid absorbing material to the first or the second band of hydrophobic material; or, to produce the 25 garment; is arranged so that any liquid pathways formed by the stitching are inside the layer of liquid impervious material. This gives the advantage that liquid that may be absorbed in the first or second layers of

absorbent material is inhibited, for example, from leaking out of the garment to wet bed clothes

By way of example, some embodiments of the invention will now be described, with reference to the drawings, of which:

- 5 Figure 1, is a perspective view of a garment according to the invention,
- Figure 2, is a perspective view of a kilt,
- Figure 3, is an exploded plan view of a kilt,
- Figure 4, is a perspective view of a loin cloth,
- Figure 5, is an exploded view of loin cloth worn,
- 10 Figure 6, is an exploded view of a kilt with an integral loin cloth,
- Figure 7, is an exploded view of a kilt with an integral diaper,
- Figure 8, is a perspective view of a culottes,
- Figure 9, is a perspective view of a separable inner culottes,
- Figure 10, is a perspective view of a separable outer culottes,
- 15 Figure 11, is a perspective view of an inner culottes with elastication,
- Figures 12 to 20, are cross-sectional views of a stitching.

Referring firstly to Figure 1, this shows a perspective view of a garment 2, according to the invention. This is in the form of a tube 4, with a waist end 10, and a hem end 12. At the waist end 10, there is an 20 adjusting means 36, in the form of a draw string 35, in tubular sleeve 37, surrounding the waist end 10. The adjusting means 36, facilitates a liquid tight seal 38, between the garment 2, and the user's body.

Referring to Figure 2, this shows a perspective view of a garment 2, according to the invention the form of a kilt 44, having a 25 longitudinal split 46, with a first edge 48, held in the overlapped position 54, by a fastening means in the form of press studs 52. Referring to Figure 3, this shows an exploded view, a cross section S<sub>1</sub>-

S<sub>1</sub> and a magnified partial view M<sub>1</sub> of the kilt 44. This shows at an outer surface 8, a layer of impervious material 14; and at an inner surface 6, a liquid absorbing material 15. The Applicant notes that a layer of impervious material 14, of 0.1mm thickness formed pin holes 5 very easily during trials. A thickness about 3.5 mm is therefore preferable. The dimensions of the of liquid absorbing material 15, are defined by a thickness 22, a waist length 19 and a length between the waist end and the hem end 20. In materials testing trials of commercially available absorbent materials, the Applicant found that 10 absorbencies of liquid ranged from 0.79 to 3.61 Kg/m<sup>2</sup>. The liquid absorbing material 15, absorbs a volume of urine 18. When wrapped around a user a first edge 48 overlaps a second edge 50. A second fastening means 53, is also shown at the waist end 10. Also at the waist end 53, there a first band of hydrophobic material 40, and at the hem 15 end 12, a second band of hydrophobic material 42.

Referring to Figure 4, this shows a perspective view, of a loin cloth 24, worn with a garment according to the invention and also to Figure 5, that shows an exploded view of the loin cloth 24, and a cross section S<sub>2</sub>-S<sub>2</sub>. The loin cloth 24 includes a second layer of liquid 20 absorbing material 26, capable of absorbing a second volume of urine 32. The dimensions of the second layer of liquid absorbing material 26, are defined by a second length 28, a second width 29, and a second thickness 30, The loin cloth 24, has closeable side openings 34.

Referring to Figure 6, this shows an exploded view of view and 25 cross-section view S<sub>3</sub>-S<sub>3</sub> of a kilt 44, with a loin cloth 24, having a fixed end 25, attached to the waist end 10, and a free end 27, that can be releaseably fastened by a third fastening means 55, at the waist end 10.

Also shown is a first layer of liquid of liquid absorbing material 16. The dimensions of the of first layer of liquid absorbing material 16, are defined by a first thickness 11, a first waist length 13, and a first length 15, between the waist end 10, and the hem end 12. The first layer of 5 liquid absorbing material 16, absorbs a first volume of urine 17. Referring to Figure 7, this shows an exploded view of a kilt 44, with a loin cloth 24, in the form of a diaper 33, having a fixed end 25, attached to the waist end 10 and a free end 27. The diaper 33, has closeable side openings 34.

10 Referring to Figure 8, this shows a perspective view of a garment 2, according to the invention the form of culottes 56, having a bifurcation 58, that forms at the hem end 12 two leg openings 60. Referring to Figure 9 and to Figure 10, these show perspective views of 15 culottes 56, in the form of a separable inner culottes 62, made from liquid absorbing material; and a separable outer culottes 64, made from liquid impervious material. In use, the separable outer culottes 64, are worn over the separable outer culottes 64. Referring to Figure 11 this shows a perspective views of a separable inner culottes 62, having elasticated seams 66, that pass from a front part 68, of the waist end 10, 20 underneath a crotch area 70, to a back portion 72, of the waist end 10.

Referring to Figures 12 to 20 these show cross sectional views of stitching 74 that may be used in garments according to the invention, arranged so that any liquid path ways formed by the stitching 74, are inside the liquid impervious layer 14. Whilst all the embodiments 25 shown in Figures 12 to 20 inhibit leakage out of the garment along the stitching 74, trials show that the arrangement shown in Figure 12 has the most leak proof characteristics.

CLAIMS

1. A garment for an in-continent user in the form of a tube with an inner surface and an outer surface, a waist end and a hem end, having at the outer surface a layer of liquid impervious material, and at the inner surface a liquid absorbing material characterised in that: the liquid absorbing material is arranged and dimensioned to give a liquid absorbency to match a urine output of the user.
2. A garment as claimed in claim 1 wherein the liquid absorbing material comprises a first and a second layer of liquid absorbing material characterised in that second layer of liquid absorbing material is contactable with the first layer of liquid absorbing material.
3. A garment as claimed in claim 1 or claim 2 being arranged in the form of a kilt, having a longitudinal split with a first edge and a second edge, the longitudinal split being sealable by overlapping the first edge over the second edge and a fastening means arranged to hold the kilt in an overlapped position.
4. A garment as claimed in either claim 2 or claim 3 wherein the second layer of liquid absorbing material is arranged in the form of a loin cloth wearable by the user.
5. A garment as claimed in claim 4 wherein the loin cloth is attached at the waist end of the garment.

6. A garment as claimed any either claim 4 or 5 wherein the loin cloth has closeable side openings.
7. A garment as claimed in any one of claim 4 to claim 6 wherein the loin cloth is arranged in the form of a diaper.
8. A garment as claimed in claim 1 being arranged in the form of culottes having a bifurcation configured to provide at the hem end two leg openings.
9. A garment as claimed in claim 8 wherein the of liquid absorbing material forms a separable inner culottes, and the layer of liquid impervious material forms a separable outer culottes.
10. A garment as claimed in claim 9 wherein the separable inner culottes has one or more elasticated seams that pass from a front part of the waist end, underneath a crotch area of the separable inner culottes, to a back portion of the waist end.
11. A garment as claimed in any one of the preceding claims wherein at the waist end an adjusting means provides a liquid tight seal between the user and the garment.
12. A garment as claimed in any one of the preceding claims wherein a first band of hydrophobic material is provided at the waist end.

13. A garment as claimed in any one of the preceding claims wherein a second band of hydrophobic material is provided at the hem end.
14. A garment as claimed in any one of the preceding claims wherein a stitching is provided to attach: the layer of liquid impervious material to the liquid absorbing material, or the layer of liquid impervious material to the first or the second band of hydrophobic material to the layer of liquid impervious material, or the liquid absorbing material to the first or the second band of hydrophobic material or, to produce the garment is arranged so that any liquid pathways formed by the stitching are inside the layer of liquid impervious material.
15. A garment as claimed in any one of claim 1 to claim 14 comprising the combination and arrangement of parts substantially as described herein with reference to Figures 1 to 20.



The  
Patent  
Office

15

Application No: GB 9716848.8  
Claims searched: 1-15

Examiner: Steven McIlroy  
Date of search: 13 October 1997

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:	
UK Cl (Ed.O): A3V	A5R (RBBX, RPF)
Int Cl (Ed.6): A41B	9/00, 9/02, 9/12 A61F 5/44, 5/48, 13/15, 13/62, 13/66, 13/72, 13/74
Other: Online:	WPI

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
A	GB 2196525 A (Andreou) See figure & lines 25-29 & 92-94 on page 1	8, 9
A	GB 1144674 A (Parravicini) See figure 7 & lines 15-26 on page 1	4
A	US 5031428 A (Kemper) See figures 16 and 17 & lines 62-66 in column 3 and abstract	4, 6 & 7
A	US 4894869 A (Boll) See figure 3 (34, 38) & lines 38-40 in column 2	8
X	US 4821342 A (Troyer) See whole document but especially figure 1 and abstract	1
A	US 3955575 A (Okuda) See figures 1 and 2 & lines 24-26 in column 2	1, 2

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.